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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,676	11/29/2001	Eric Wu	NA01-002	7361

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EXAMINER	
PHAM, TUAN	
ART UNIT	**PAPER NUMBER**
2643	

DATE MAILED: 09/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/998,676	WU ET AL.	
	Examiner	Art Unit	
	TUAN A. PHAM	2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 07-21-2005 have been fully considered but they are not persuasive.

In response to applicant's remark on page 14, Applicant argues that the combination of Zinn (Pub. No.: US 2003/0064684) and Hamada (U.S. Patent No.: 4,059,807) does not teach:

"a pulse width amplifier to receive an audio signal and modulate a pulse width of a digital timing signal with said audio signal, such that the pulse width is proportional to an amplitude of said analog audio signal to provide a pulse width modulated signal", and

"an integrator in communication with the down-converter to receive the extracted pulse width modulated signal to remove a timing signal from said extracted pulse width modulated signal to restore the signal" ", in claims 1, 15, and 20.

In response to applicant's arguments as stated above, the Examiner respectfully disagrees with the Applicant's argument. Zinn teaches an apparatus for encoding and decoding for a receiver and transmitter that include a pulse width modulated. Zinn also teaches an integrator circuit for filtering out or removing the timing signal (i.e., triangle wave signal) from the input signal Vin to reform or restore the Vin signal (see figure 6, integrator 222, col.3, [0024]). On the other hand, Hamada teaches a pulse width amplifier to receive an audio signal and modulate a pulse width of a digital timing signal

with said audio signal, such that the pulse width is proportional to an amplitude of said analog audio signal to provide a pulse width modulated signal (see figure 1, figure 2, input audio signal 11a, sawtooth carrier signal A, audio signal B, pulse width signal C, it is obvious that the pulse width signal is proportional to an amplitude of the analog signal that is the basic of modulator). Furthermore, Hamada also teaches acquiring the audio signal, comparing said audio signal with a timing signal, from said comparing, forming a pulse width modulated signal (see figure 2, col.2, ln.54-68).

Base on the above rational, it is believed that the claimed limitations are met by the combination of Zinn and Hamada and therefore, the rejection are still maintained.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. **Claims 1, 3-4, 6, 8, 10-12, 15-16, 18, 20, 22-23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zinn (Pub. No.: US 2003/0064684) in view of Hamada (U.S. Patent No.: 4.059,807).**

Regarding claim 1, Zinn teaches a method and a wireless audio transmission and reception system comprising:

an up-converter in communication with the pulse width amplifier (i.e., comparator) to receive the pulse width modulated signal and convert the pulse width modulated signal to a modulated carrier signal (i.e., frequency modulation signal)(see figure 3, transmitter 164 included mixer or up-converter, col.2, [0026]);

a transmitter in communication with the modulated carrier signal to transfer the modulated carrier signal wirelessly (see col.2, [0026]);

a receiver to receive the modulated carrier signal (i.e., frequency modulation signal) (see figure 6, the frequency modulation of the transmitter 164, col.3, [0032]); a down-converter in communication with the receiver to receive the modulated carrier signal and extract the pulse width modulated signal from the modulated carrier signal (see figure 6, mixer 240, col.3, [0032]); and

an integrator in communication with the down-converter to receive the extracted pulse width modulated signal to remove a timing signal from said extracted pulse width modulated signal to restore the audio signal (see figure 6, integrator 222, col.3, [0032],

integrator to filter out or remove a timing signal such as triangle wave signal with the input signal Vin to reform or restore the Vin signal).

It should be noticed that Zinn fails to teach an audio signal and modulate a pulse width of a digital timing signal (i.e., sawtooth signal) with the audio signal, such that the pulse width is proportional to an amplitude of the audio signal to provide a pulse width modulated signal. However, Hamada teaches such features (see figure 1 and 2, input audio signal 11a, sawtooth carrier signal A, analog signal B, pulse width signal C, col.2, ln.39-68, col.3, ln.1-20, it is obvious that the pulse width signal is proportional to an amplitude of the analog signal that is the basic of modulator).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Hamada into view of Zinn, in order to simple design and low cost as suggested by Hamada at column 1, lines 20-30.

Regarding claim 3, Zinn further teaches the method and the pulse width amplifier comprises a comparator having a first input to receive the audio signal and a second input to receive the timing signal, said timing signal having a triangular form such that, as said comparator compares the audio signal and the timing signal, the pulse width modulated signal is provided to an output of said comparator (see figure 3, comparator 160, input 160a, 160b, output pulse width modulation signal at 132, col.2, [0026]).

Regarding claim 4, Zinn further teaches the method and the up-converter comprises a modulation apparatus to combine a carrier frequency with the pulse width modulated signal to form the modulated carrier signal (see figure 3, transmitter 164

comprises a mixer for mixing the pulse width modulated signal with reference frequency which generated by local oscillator, col.2, [0026]).

Regarding claim 6, Zinn further teaches the down-converter comprises a demodulation apparatus to extract the pulse width modulated signal from the modulated carrier signal (see figure 6, col.3, [0032]).

Regarding claim 8, Hamada further teaches the low pass filter having a cut off frequency suitable to pass the audio signal and remove the timing signal (see figure 1, LPF 16, col.3, ln.21-30).

Regarding claim 10, Zinn teaches a wireless audio transmitter system comprising (see figure 3):

an up-converter in communication with the pulse width amplifier (i.e., comparator) to receive the pulse width modulated signal and convert the pulse width modulated signal to a modulated carrier signal (i.e., frequency modulation signal)(see figure 3, transmitter 164 included mixer or up-converter, col.2, [0026]);

a transmitter in communication with the modulated carrier signal to transfer the modulated carrier signal wirelessly (see col.2, [0026]);

It should be noticed that Zinn fails to teach an analog signal and modulate a pulse width of a digital timing signal (i.e., sawtooth signal) with the audio signal, such that the pulse width is proportional to an amplitude of the audio signal to provide a pulse width modulated signal. However, Hamada teaches such features (see figure 1 and 2, input audio signal 11a, sawtooth carrier signal A, audio signal B, pulse width signal C,

col.2, ln.39-68, col.3, ln.1-20, it is obvious that the pulse width signal is proportional to an amplitude of the analog signal that is the basic of modulator).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Hamada into view of Zinn, in order to simple design and low cost as suggested by Hamada at column 1, lines 20-30.

Regarding claim 11, Hamada further teaches the pulse width amplifier comprises a comparator having a first input to receive the audio signal and a second input to receive the timing signal, said timing signal having a triangular form such that, as said comparator compares the audio signal and the timing signal, the pulse width modulated signal is provided to an output of said comparator (see figure 1 and 2, sawtooth carrier signal A, analog signal B, pulse width signal C, col.2, ln.39-68, col.3, ln.1-20).

Regarding claim 12, Zinn further teaches the up-converter comprises a modulation apparatus to combine a carrier frequency with the pulse width modulated signal to form the modulated carrier signal (see figure 3, transmitter 164 comprises a mixer for mixing the pulse width modulated signal with reference frequency which generated by local oscillator, col.2, [0026]).

Regarding claim 15, Zinn teaches a wireless audio receiver system comprising (see figure 6): a receiver to receive a modulated carrier signal (read on frequency modulation signal) (see figure 6, the frequency modulation of the transmitter 164, col.3, [0032]); a down-converter in communication with the receiver to receive the modulated carrier signal and extract a pulse width modulated signal from the modulated carrier

signal (see figure 6, mixer 240, col.3, [0032]); and an integrator in communication with the down-converter to receive the extracted pulse width modulated signal to remove a timing signal from said extracted pulse width modulated signal to restore the analog signal (see figure 6, integrator 222, col.3, [0032], integrator to filter out or remove a timing signal such as triangle wave signal with the input signal Vin to reform or restore the Vin signal).

It should be noticed that Zinn fails to teach the audio input signal. However, Hamada teaches such feature (see figure 1, audio input signal 11a, col.1, ln.59-68).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Hamada into view of Zinn, in order to provide the audio input.

Regarding claim 16, Zinn further teaches the down-converter comprises a demodulation apparatus to extract the pulse width modulated signal from the modulated carrier signal (see figure 6, mixer 240, col.3, [0032]).

Regarding claim 18, Zinn further teaches the integrator is a low pass filter having a cut off frequency suitable to pass the audio signal and remove the timing signal (see figure 6, integrator 222, col.3, [0032], e.g., the integrator can be a low pass filter to filter out the reference voltage signal, such as a triangle wave signal to reform the original audio analog signal).

Regarding claim 20, Zinn teaches a method for wireless transmission of an audio signal comprising the steps of: up-converting the pulse width modulated signal to a modulated carrier signal (i.e., frequency modulation signal)(see figure 3, transmitter

164 included mixer or up-converter, col.2, [0026]); transmitting said modulated carrier signal (see col.2, [0026]); receiving said modulated carrier signal (i.e., frequency modulation signal) (see figure 6, the frequency modulation of the transmitter 164, col.3, [0032]); down-converting said modulated carrier signal to restore the pulse width modulated signal (see figure 6, mixer 240, col.3, [0032]); and integrating the restored pulse width modulated signal to extract said analog signal (see figure 6, integrator 222, col.3, [0032], e.g., the integrator can be a low pass filter to filter out the reference voltage signal, such as a triangle wave signal to reform the original analog signal).

It should be noticed that Zinn fails to teach acquiring the audio signal; comparing said audio signal with a timing signal; from said comparing, forming a pulse width modulated signal (see figure 1 and 2, input audio signal 11a, sawtooth carrier signal A, analog signal B, pulse width signal C, col.2, ln.39-68, col.3, ln.1-20, it is obvious that the pulse width signal is proportional to an amplitude of the analog signal that is the basic of modulator).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Hamada into view of Zinn, in order to simple design and low cost as suggested by Hamada at column 1, lines 20-30.

Regarding claim 22, Zinn further teaches the method wherein the comparing the audio signal to the timing signal and forming the pulse width modulated signal comprises the step of: forming the timing signal to have a triangular waveform; comparing the amplitude of the audio signal to the amplitude of the triangular waveform; if the amplitude of the audio signal is greater than the amplitude of the timing signal,

setting the pulse width modulated signal to a first logic level; and if the amplitude of the audio signal is less than the amplitude of the timing signal, setting the pulse width modulated signal to a second logic level (see figure 3, comparator 160, input 160a, 160b, output pulse width modulation signal at 132, col.2, [0026]).

Regarding claim 23, Zinn further teaches the method wherein the up converting the pulse width modulating signal to the modulated carrier signal comprises the steps of combining a carrier frequency with the pulse width modulated signal to form the modulated carrier signal (see figure 3, transmitter 164 comprises a mixer for mixing the pulse width modulated signal with reference frequency which generated by local oscillator, col.2, [0026]).

Regarding claim 25, Zinn further teaches the wherein the down-converting said modulated carrier signal to restore the pulse width modulated signal comprises the step of: combining a local oscillator signal with the modulated carrier signal to restore the pulse width modulated signal (see figure 6, col.3, [0032]).

4. Claims 2 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zinn (Pub. No.: US 2003/0064684) in view of Hamada (U.S. Patent No.: 4.059,807) as applied to claims 1 and 20 above, and further in view of Katagishi et al. (Pub. No.: US 2003/0017840, hereinafter, "Katagishi").

Regarding claims 2 and 21, Zinn and Hamada, in combination, fails to teach teaches the method and the pulse width amplifier power amplifier in communication with the integrator to receive the audio signal and amplify said audio signal and transfer said

amplified audio signal to a transducer. However, Katagishi teaches such features (see figure 1, speaker 620, BPF 126, col.3, [0033-0034]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Katagishi into view of zinn and Hamada, in order to filter out the unwanted signals.

5. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zinn (Pub. No.: US 2003/0064684) in view of Hamada (U.S. Patent No.: 4.059,807) as applied to claim 15 above, and further in view of Shamlou et al. (U.S. Patent No.: 6,690,949, hereinafter, "Shamlou").

Regarding claims 17, Zinn and Hamada, in combination, fails to teach the demodulation apparatus is selected from a group of modulation apparatus consisting quadrature phase shift keying modulation apparatus. However, Shamlou teaches such features (see figure 1, modulator 16, col.4, ln.60-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Shamlou into view of Zinn, in order to alternate modulation scheme for digital transmission in wireless system.

Regarding claim 19, Shamlou further teaches the carrier frequency is at least 900 MHz (see col.3, ln.43-45).

6. Claims 5, 7, 9, 13-14, 24, 26, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zinn (Pub. No.: US 2003/0064684) in view of Hamada (U.S. Patent No.: 4.059,807) as applied to claims 1 and 20 above, and further in view of Shamlou et al. (U.S. Patent No.: 6,690,949, hereinafter, "Shamlou").

Regarding claims 5, 7, 13, 24, and 26, Zinn and Hamada, in combination, fails to teach modulation and demodulation apparatus is selected from a group of modulation apparatus consisting quadrature phase shift keying modulation apparatus. However, Shamlou teaches such features (see figure 1, modulator 16, col.4, ln.60-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Shamlou into view of zinn and Hamada, in order to alternate modulation scheme for digital transmission in wireless system.

Regarding claims 9, 14 and 27, Shamlou further teaches the carrier frequency is at least 900 MHz (see col.3, ln.43-45).

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Tuan A. Pham** whose telephone number is (571) 272-8097. The examiner can normally be reached on Monday through Friday, 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Curtis Kuntz can be reached on (571) 272-7499 and

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Art Unit 2643
September 21, 2005
Examiner

Tuan Pham

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